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SILVERBROOK RESEARCH PTY LTD
393 DARLING STREET
BALMAIN, NSW 2041
AUSTRALIA

EXAMINER	
HSIEH, SHIH WEN	
ART UNIT	**PAPER NUMBER**
2861	

DATE MAILED: 03/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/728,952	SILVERBROOK ET AL.
	Examiner	Art Unit
	Shih-wen Hsieh	2861

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 December 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-54* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-54* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *12-20-04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 1, 10, 19, 29, 38, 46 and 47 are objected to because of the following informalities:

In regard to:

Claims 1, 19 and 38:

The followings are to correct a minor lack of antecedent basis problem:

line 5/6 (claim 38), please change "the boiling point" into "a boiling point"

line 6, please change "the ejection" into "an ejection".

Claims 10, 29 and 46:

line 2, please change "the area density" into "an area density".

Claim 47:

Please add "." at the end of this claim to indicate this claim has come to an end.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 8 and 27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The recitation of: "wherein each of the nozzles defines an ejection aperture positioned less than 50 microns from the ejection aperture" is unclear. Please refer to fig. 1. In fig. 1, nozzle is indicated as numeral "3", and ejection aperture is indicated as numeral "5". Generally, in ink jet printer, nozzle and ejection aperture mean the same thing. So in this claim the recitation is to propose: the ejection aperture being defined by the nozzle is positioned less than 50 microns **from itself** (the ejection aperture). This does not sound right, if Examiner analyzes this claim right. Examiner suggests a recitation of: wherein each of the nozzles defines an ejection aperture positioned less than 50 microns **from the nozzles** would be more appropriate. Please advice. There is no rejection other than this rejection to those claims in this office action.

Double Patenting

4. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422

F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

5. Claims 1-7, 9-26 and 28-54 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 3, 4, 6-20, 22-35 and 38-47 of U.S. Patent No. 6,692,108 B1 respectively. Although the conflicting claims are not identical, they are not patentably distinct from each other because both cases deal with in ink jet head with a certain drive energy. Below is a table of comparison between claims to indicate their obviousness:

10/728,952	**6,692,108 B1**
1. An inkjet printhead comprising: a plurality of nozzles, at least one heater element corresponding to each of the nozzles respectively, the heater element configured for thermal contact with a bubble forming liquid; such that, heating the heater element to a temperature above the boiling point of the bubble forming liquid forms a gas bubble that causes the ejection of a drop of an ejectable liquid through the nozzle corresponding to that heater element; wherein, the heater element requires less than 200 nanojoules of energy in order to form the gas bubble that causes the ejection of the drop of	**1**. An ink jet printhead comprising: a plurality of nozzles; and at least one respective heater element corresponding to each nozzle, wherein each heater element is arranged to be in thermal contact with a bubble forming liquid, each heater element is configured to heat at least part of the bubble forming liquid to a temperature above its boiling point to form a gas bubble therein, thereby to cause the ejection of a drop of an ejectable liquid through the nozzle corresponding to that heater element, and each heater element is configured such that an actuation energy of less than 180

ejectable liquid. **2**.The printhead of claim 1 wherein the heater element requires less than 150 nanoloules of energy in order to form the gas bubble that causes the ejection of the drop of ejectable liquid. **3**. The printhead of claim 1 wherein the heater element requires less than 100 nanojoules of energy in order to form the gas bubble that causes the ejection of the drop of ejectable liquid. **4**. The printhead of claim 1 wherein the heater element requires less than 80 nanojoules of energy in order to form the gas bubble that causes the ejection of the drop of ejectable liquid.	nanojoules (nJ) is required to be applied to that heater element to heat that heater element sufficiently to form a bubble in the bubble forming liquid thereby to cause the ejection of a drop of the ejectable liquid through a nozzle.
5. The printhead of claim 1 wherein the bubble forming liquid and the ejectable liquid are of a common body of liquid.	**3**. The printhead of claim 1 wherein the bubble forming liquid and the ejectable liquid are of a common body of liquid.
6. The printhead of claim 1 being configured to print on a page and to be a page-width printhead.	**4**. The printhead of claim 1 being configured to print on a page and to be a page-width printhead.
7. The printhead of claim 1 wherein each heater element is in the form of a cantilever beam.	**6**. The printhead of claim 1 wherein each heater element is in the form of a suspended beam, arranged for being suspended over at least a portion of the bubble forming liquid so as to be in thermal contact therewith.
9. The printhead of claim 1 configured to receive a supply of the ejectable liquid at an ambient temperature, wherein each heater element is configured such that the energy required to be applied thereto to heat said part to cause the ejection of a said drop is less than the energy required to heat a volume of said ejectable liquid equal to the volume of the said drop, from a temperature equal to said ambient temperature to said boiling point.	**7**. The printhead of claim 1 configured to receive a supply of the ejectable liquid at an ambient temperature, wherein each heater element is configured such that the energy required to be applied thereto to heat said part to cause the ejection of a said drop is less than the energy required to heat a volume of said ejectable liquid equal to the volume of the said drop, from a temperature equal to said ambient temperature to said boiling point.
10. The printhead of claim 1 comprising a substrate having a substrate surface, wherein the areal density of the	**8**. The printhead of claim 1 comprising a substrate having a substrate surface, wherein each nozzle has a nozzle

nozzles relative to the substrate surface exceeds 10,000 nozzles per square cm of substrate surface.	aperture opening through the substrate surface, and wherein the areal density of the nozzles relative to the substrate surface exceeds 10,000 nozzles per square cm of substrate surface.
11. The printhead of claim 1 wherein each heater element has two opposite sides and is configured such that a said gas bubble formed by that heater element is formed at both of said sides of that heater element.	**9**. The printhead of claim 1 wherein each heater element has two opposite sides and is configured such that a said gas bubble formed by that heater element is formed at both of said sides of that heater element.
12. The printhead of claim 1 wherein the bubble which each element is configured to form is collapsible and has a point of collapse, and wherein each heater element is configured such that the point of collapse of a bubble formed thereby is spaced from that heater element.	**10**. The printhead of claim 1 wherein the gas bubble which each heater element is configured to form is collapsible and has a point of collapse, and wherein each heater is configured such that the point of collapse of a bubble formed thereby is spaced from that heater element.
13. The printhead of claim 1 comprising a structure that is formed by chemical vapor deposition (CVD), the nozzles being incorporated on the structure.	**11**. The printhead of claim 1comprising astructure that is formed by chemical vapor deposition (CVD), the nozzles being incorporated on the structure.
14. The printhead of claim 1 comprising a structure which is less than 10 microns thick, the nozzles being incorporated on the structure.	**12**. The printhead of claim 1 comprising a structure being less than 10 microns thick, the nozzles being incorporated on the structure.
15. The printhead of claim 1 comprising a plurality of nozzle chambers each corresponding to a respective nozzle, and a plurality of said heater elements being disposed within each chamber, the heater elements within each chamber being formed on different respective layers to one another.	**13**. The printhead of claim 1 comprising a plurality of nozzle chambers, each corresponding to a respective nozzle, and a plurality of said heater elements being disposed within each chamber, the heater elements within each chamber being formed on different respective layers to one another.
16. The printhead of claim 1 wherein each heater element is formed of solid material more than 90% of which, by atomic proportion, is constituted by at least one periodic element having an atomic number below 50.	**14**. The printhead of claim 1 wherein each heater element is formed of solid material more than 90% of which, by atomic proportion, is constituted by at least one periodic element having an atomic number below 50.
17. The printhead of claim 1 wherein each heater element includes solid material and is configured for a mass of	**15**. The printhead of claim 1 wherein each heater element includes solid material and is configured for a mass of

less than 10 nanograms of the solid material of that heater element to be heated to a temperature above said boiling point thereby to heat said part of the bubble forming liquid to a temperature above said boiling point to cause the ejection of a said drop.	less than 10 nanograms of the solid material of that heater element to be heated to a temperature above said boiling point to cause the ejection of a said drop.
18. The printhead of claim 1 wherein each heater element is substantially covered by a conformal protective coating, the coating of each heater element having been applied substantially to all sides of the heater element simultaneously such that the coating is seamless.	**16**. The printhead of claim 1 wherein each heater element is substantially covered by a conformal protective coating, the coating of each heater element having been applied substantially to all sides of the heater element simultaneously such that the coating is seamless.
19. A printer system which incorporates a printhead, the printhead comprising: a plurality of nozzles, at least one heater element corresponding to each of the nozzles respectively, the heater element configured for thermal contact with a bubble forming liquid; such that, heating the heater element to a temperature above the boiling point of the bubble forming liquid forms a gas bubble that causes the ejection of a drop of an ejectable liquid through the nozzle corresponding to that heater element; wherein, the heater element requires less than 200 nanojoules of energy in order to form the gas bubble that causes the ejection of the drop of ejectable liquid. **20**. The system of claim 19 Wherein the heater element requires less than 150 nanojoules of energy in order to form the gas bubble that causes the ejection of the drop of ejectable liquid. **21**. The system of claim 19 wherein the heater element requires less than 100 nanojoules of energy in order to form the gas bubble that causes the ejection of the drop of ejectable liquid.	**17**. A printer system incorporating a printhead, the printhead comprising: a plurality of nozzles; and at least one respective heater element corresponding to each nozzle, wherein each heater element is arranged to be in thermal contact with a bubble forming liquid, each heater element is configured to heat at least part of the bubble forming liquid to a temperature above its boiling point to form a gas bubble therein, thereby to cause the ejection of a drop of an ejectable liquid through the nozzle corresponding to that heater element, and each heater element is configured such that an actuation energy of less than 180 nanojoules (nJ) is required to be applied to that heater element to heat that heater element sufficiently to form a bubble in the bubble forming liquid thereby to cause the ejection of a drop of the ejectable liquid through a nozzle.

22. The system of claim 19 wherein the heater element requires less than 80 nanojoules of energy in order to form the gas bubble that causes the ejection of the drop of ejectable liquid.	
23. The system of claim 19 being configured to support the bubble forming liquid in thermal contact with each said heater element, and to support the ejectable liquid adjacent each nozzle.	**18**. The system of claim 17 being configured to support the bubble forming liquid in thermal contact with each said heater element, and to support the ejectable liquid adjacent each nozzle.
24. The system of claim 19 wherein the bubble forming liquid and the ejectable liquid are of a common body of liquid.	**19**. The system of claim 17 wherein the bubble forming liquid and the ejectable liquid are of a common body of liquid.
25. The system of claim 19 being configured to print on a page and to be a page-width printhead.	**20**. The system of claim 17 being configured to print on a page and to be a page-width printhead.
26. The system of claim 19 wherein each heater element is in the form of a cantilever beam.	**22**. The system of claim 17 wherein each heater element is in the form of a suspended beam, arranged for being suspended over at least a portion of the bubble forming liquid so as to be in thermal contact therewith.
28. The system of claim 19, wherein the printhead is configured to receive a supply of the ejectable liquid at an ambient temperature, and wherein each heater element is configured such that the energy required to be applied thereto to heat said part to cause the ejection of a said drop is less than the energy required to heat a volume of said ejectable liquid equal to the volume of the said drop, from a temperature equal to said ambient temperature to said boiling point.	**23**. The system of claim 17, wherein the printhead is configured to receive a supply of the ejectable liquid at an ambient temperature, and wherein each heater element is configured such that the energy required to be applied thereto to heat said part to cause the ejection of a said drop is less than the energy required to heat a volume of said ejectable liquid equal to the volume of the said drop, from a temperature equal to said ambient temperature to said boiling point.
29. The system of claim 19 comprising a substrate having a substrate surface, wherein the areal density of the nozzles relative to the substrate surface exceeds 10,000 nozzles per square cm of substrate surface.	**24**. The system of claim 17 comprising a substrate having a substrate surface, wherein each nozzle has a nozzle aperture opening through the substrate surface, and wherein the areal density of the nozzles relative to the substrate surface exceeds 10,000

	nozzles per square cm of substrate surface.
30. The system of claim 19 wherein each heater element has two opposite sides and is configured such that a said gas bubble formed by that heater element is formed at both of said sides of that heater element.	**25**. The system of claim 17 wherein each heater element has two opposite sides and is configured such that a said gas bubble formed by that heater element is formed at both of said sides of that heater element.
31. The system of claim 19 wherein the bubble which each element is configured to form is collapsible and has a point of collapse, and wherein each heater element is configured such that the point of collapse of a bubble formed thereby is spaced from that heater element.	**26**. The system of claim 17 wherein the gas bubble which each heater element is configured to form is collapsible and has a point of collapse, and wherein each heater is configured such that the point of collapse of a bubble formed thereby is spaced from that heater element.
32. The system of claim 19 comprising a structure that is formed by chemical vapor deposition (CVD), the nozzles being incorporated on the structure.	**27**. The system of claim 17 comprising a structure that is formed by chemical vapor deposition (CVD), the nozzles being incorporated on the structure.
33. The system of claim 19 comprising a structure which is less than 10 microns thick, the nozzles being incorporated on the structure.	**28**. The system of claim 17 comprising a structure being less than 10 microns thick, the nozzles being incorporated on the structure.
34. The system of claim 19 comprising a plurality of nozzle chambers each corresponding to a respective nozzle, and a plurality of said heater elements being disposed within each chamber, the heater elements within each chamber being formed on different respective layers to one another.	**29**. The system of claim 17 comprising a plurality of nozzle chambers, each corresponding to a respective nozzle, and a plurality of said heater elements being disposed within each chamber, the heater elements within each chamber being formed on different respective layers to one another.
35. The system of claim 19 wherein each heater element is formed of solid material more than 90% of which, by atomic proportion, is constituted by at least one periodic element having an atomic number below 50.	**30**. The system of claim 17 wherein each heater element is formed of solid material more than 90% of which, by atomic proportion, is constituted by at least one periodic element having an atomic number below 50.
36. The system of claim 19 wherein each heater element includes solid material and is configured for a mass of less than 10 nanograms of the solid material of that heater element to be heated to a temperature above said	**31**. The system of claim 17 wherein each heater element includes solid material and is configured for a mass of less than 10 nanograms of the solid material of that heater element to be heated to a temperature above said

boiling point thereby to heat said part of the bubble forming liquid to a temperature above said boiling point to cause the ejection of a said drop.	boiling point to cause the ejection of a said drop.
37. The system of claim 19 wherein each heater element is substantially covered by a conformal protective coating, the coating of each heater element having been applied substantially to all sides of the heater element simultaneously such that the coating is seamless.	**32**.The system of claim 17 wherein each heater element is substantially covered by a conformal protective coating, the coating of each heater element having been applied substantially to all sides of the heater element simultaneously such that the coating is seamless.
38. A method of ejecting drops of an ejectable liquid from a printhead, the printhead comprising a plurality of nozzles and at least one heater element corresponding to each of the nozzles respectively; the method comprising the steps of: feeding bubble forming liquid into thermal contact with the heater element; heating the heater element to a temperature above the boiling point of the bubble forming liquid to form a gas bubble such that a drop of an ejectable liquid is ejected through the nozzle corresponding to that heater element; wherein, less than 200 nanojoules of energy is transferred to the heater element in order to form the gas bubble that causes the ejection of the drop of ejectable liquid. **39**. The method of claim 38 wherein the heater element requires less than 150 nanojoules of energy in order to form the gas bubble that causes the ejection of the drop of ejectable liquid. **40**. The method of claim 38 wherein the heater element requires less than 100 nanojoules of energy in order to form the gas bubble that causes the ejection of the drop of ejectable liquid. **41**. The method of claim 38 wherein	**33**. A method of ejecting a drop of an ejectable liquid from a printhead, the printhead comprising a plurality of nozzles and at least one respective heater element corresponding to each nozzle, the method comprising the steps of: applying an actuation energy of less than 180 nJ to at least one heater element corresponding to said nozzle; heating that at least one heater element by said step of applying an actuation energy, thereby to heat at least part of a bubble forming liquid which is in thermal contact with that at least one heated heater element to a temperature above the boiling point of the bubble forming liquid; generating a gas bubble in the bubble forming liquid by said step of heating; and causing the drop of ejectable liquid to be ejected through the nozzle corresponding to the at least one heated heater element by said step of generating a gas bubble. **34**. The method of claim 33 comprising, before said step of heating, the steps of: disposing the bubble forming liquid in thermal contact with the heater elements; and disposing the ejectable liquid adjacent the nozzles.

the heater element requires less than 80 nanojoules of energy in order to form the gas bubble that causes the ejection of the drop of ejectable liquid.	
42. The method of claim 38 wherein the bubble forming liquid and the ejectable liquid are of a common body of liquid.	**35**. The method of claim 33 wherein the bubble forming liquid and the ejectable liquid are of a common body of liquid.
43. The method of claim 38 wherein the bubble forming liquid is fed to the at least one heater element so that it substantially surrounds the heater element.	**34**. The method of claim 33 comprising, before said step of heating, the steps of: disposing the bubble forming liquid in thermal contact with the heater elements; and disposing the ejectable liquid adjacent the nozzles.
44. The method of claim 38 wherein the printhead is a page-width printhead.	**4**. The printhead of claim 1 being configured to print on a page and to be a page-width printhead.
45. The method of claim 38 wherein prior to the step of heating the at least one heater element, a supply of the ejectable liquid, at an ambient temperature, is fed to the printhead, wherein the step of heating is effected by applying heat energy to the at least one heater element, wherein said applied heat energy is less than the energy required to heat a volume of said ejectable liquid equal to the volume of said drop, from a temperature equal to said ambient temperature to said boiling point.	**38**. The method of claim 33, comprising, prior to the step of heating at least one heater element, the step of receiving a supply of the ejectable liquid, at an ambient temperature, to the printhead, wherein said actuation energy is less than the energy required to heat a volume of said ejectable liquid equal to the volume of said drop, from a temperature equal to said ambient temperature to said boiling point.
46. The method of claim 38 wherein the printhead includes a substrate on which said nozzles are disposed, the substrate having a substrate surface and the areal density of the nozzles relative to the substrate surface exceeding 10,000 nozzles per square cm of substrate surface.	**39**. The method of claim 33 comprising the step of providing the printhead, wherein the printhead includes a substrate on which said nozzles are disposed, the substrate having a substrate surface, and the areal density of the nozzles relative to the substrate surface exceeding 10,000 nozzles per square cm of substrate surface.
47. The method of claim 38 wherein the at least one heater element has two opposing sides and the bubble is generated at both of said sides of each	**40**. The method of claim 33 wherein each heater element has two opposite sides and wherein, in the step of generating a gas bubble, the bubble is

heated heater element.	generated at both of said sides of each heated heater element.
48. The method of claim 38 wherein the generated bubble is collapsible and has a point of collapse, and is generated such that the point of collapse is spaced from the at least one heater element.	**41**. The method of claim 33 wherein, in the step of generating a gas bubble, the generated bubble is collapsible and has a point of collapse, and is generated such that the point of collapse is spaced from the at least one heated heater element.
49. The method of claim 38 wherein the printhead has a structure that is less than 10 microns thick and which incorporates said nozzles thereon.	**43**. The method of claim 33 comprising the step of providing the printhead, wherein the printhead has a structure which is less than 10 microns thick and which incorporates said nozzles thereon.
50. The method of claim 38 wherein the nozzles of the printhead are formed by chemical vapor deposition (CVD).	**42**. The method of claim 33 comprising the step of providing the printhead, including forming a structure by chemical vapor deposition (CVD), the structure incorporating the nozzles thereon.
51. The method of claim 38 wherein the printhead has a plurality of nozzle chambers each chamber corresponding to a respective nozzle and a plurality of said heater elements are formed in each of the chambers, such that the heater elements in each chamber are formed on different respective layers to one another.	**44**. The method of claim 33 comprising the step of providing the printhead, wherein the printhead has a plurality of nozzle chambers, each chamber corresponding to a respective nozzle, the step of providing the printhead further including forming a plurality of said heater elements in each chamber such that the heater elements in each chamber are formed on different respective layers to one another.
52. The method of claim 38 wherein the heater elements are formed of solid material more than 90% of which, by atomic proportion, is constituted by at least one periodic element having an atomic number below 50.	**45.** The method of claim 33 comprising the step of providing the printhead, wherein each heater element is formed of solid material more than 90% of which, by atomic proportion, is constituted by at least one periodic element having an atomic number below 50.
53. The method of claim 38 wherein the heater elements include solid material and wherein the step of heating at least one heater element	**46**. The method of claim 33 wherein each heater element includes solid material and wherein the step of heating the at least one heater element

comprises heating a mass of less than 10 nanograms of the solid material of each such heater element to a temperature above said boiling point.	comprises heating a mass of less than 10 nanograms of the solid material of each such heater element to a temperature above said boiling point.
54. The method of claim 38 wherein a conformal protective coating is applied to substantially to all sides of each of the heater elements simultaneously, such that the coating is seamless.	**47**. The method of claim 33 comprising the step of providing the printhead, including applying to each heater element, substantially to all sides thereof simultaneously, a conformal protective coating such that the coating is seamless.

Discussions of the claims between the instant application and the patent ('108) are set for the below:

In regard to:

Claims 1-4:

Corresponding to claim 1 of patent ('108), with a only difference in the nanojoules. Regarding to this, since patent ('108) requires an energy, which is less than180 nanojoules, therefore, all the nanojoules in claims 1-4 of the instant application can read on this 180 nanojoules.

Claim 5:

Corresponding to claim 3 of patent ('108).

Claim 6:

Corresponding to claim 4 of patent ('108).

Claim 7:

Corresponding to claim 6 of patent ('108). The difference is:

Claim 7 of the instant application recites a cantilever, while claim 6 of patent ('108) recites a suspended beam, and it is understood to a person skilled in the art that the suspended beam is a cantilever beam.

Claim 9:

Corresponding to claim 7 of patent ('108).

Claim 10:

Corresponding to claim 8 of patent ('108).

Claim 11:

Corresponding to claim 9 of patent ('108).

Claim 12:

Corresponding to claim 10 of patent ('108).

Claim 13:

Corresponding to claim 11 of patent ('108).

Claim 14:

Corresponding to claim 12 of patent ('108).

Claim 15:

Corresponding to claim 13 of patent ('108).

Claim 16:

Corresponding to claim 14 of patent ('108).

Claim 17:

Corresponding to claim 15 of patent ('108).

Claim 18:

Corresponding to claim 16 of patent ('108).

Claims 19-22:

Corresponding to claim 17 of patent ('108). Discussion to the nanojoules is the same as that in claims 1-4 discussed above, and does not repeat here.

Claim 23:

Corresponding to claim 18 of patent ('108).

Claim 24:

Corresponding to claim 19 of patent ('108).

Claim 25:

Corresponding to claim 20 of patent ('108).

Claim 26:

Corresponding to claim 22 of patent ('108). Discussion for the cantilever is the same as that in claim 7 discussed above, and does not repeat here.

Claim 28:

Corresponding to claim 23 of patent ('108).

Claim 29:

Corresponding to claim 24 of patent ('108).

Claim 30:

Corresponding to claim 25 of patent ('108).

Claim 31:

Corresponding to claim 26 of patent ('108).

Claim 32:

Corresponding to claim 27 of patent ('108).

Claim 33:

Corresponding to claim 28 of patent ('108).

Claim 34:

Corresponding to claim 29 of patent ('108).

Claim 35:

Corresponding to claim 30 of patent ('108).

Claim 36:

Corresponding to claim 31 of patent ('108).

Claim 37:

Corresponding to claim 32 of patent ('108).

Claims 38-41:

Corresponding to claims 33 plus 34 of patent ('108). Discussion of nanojoules is the same as that set forth for claims 1-4 discussed above, and does not repeat here.

Claim 42:

Corresponding to claim 35 of patent ('108).

Claim 43:

Corresponding to claim 34 of patent ('108).

Claim 44:

Corresponding to claim 4 of patent ('108).

Claim 45:

Corresponding to claim 38 of patent ('108).

Claim 46:

Corresponding to claim 39 of patent ('108).

Claim 47:

Corresponding to claim 40 of patent ('108).

Claim 48:

Corresponding to claim 41 of patent ('108).

Claim 49:

Corresponding to claim 43 of patent ('108).

Claim 50:

Corresponding to claim 42 of patent ('108).

Claim 51:

Corresponding to claim 44 of patent ('108).

Claim 52:

Corresponding to claim 45 of patent ('108).

Claim 53:

Corresponding to claim 46 of patent ('108).

Claim 54:

Corresponding to claim 47 of patent ('108).

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shih-wen Hsieh whose telephone number is 571-272-2256. The examiner can normally be reached on 7:30AM -5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, S D. Meier can be reached on 571-272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SHIH-WEN HSIEH
PRIMARY EXAMINER

Shih-wen Hsieh
Primary Examiner
Art Unit 2861

SWH
March 16, 2006